

Crop Recommendation System for Precision Agriculture: Enhancing Yield and Sustainability

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ABSTRACT: Agriculture is the back bone of India. More than 58% people are depending up on the farming. Which is also a major source for the country revenue. Farmers were grow their crops as their child and in a traditional way. Some times they were failed in selecting correct crop to grow in the field. So, Here introducing a remedy to support the farmers to predict the correct crop to grown by the analyzing the soil results such as phosphorous content, nitrogen content, potassium content, temperature, humidity, PH value, rain fall. By studying the above results and suggests a correct crop should be grown. Which is more helpful to farmers to select the correct crop at the correct time. Recommendation of crops is one major domain in precision agriculture. Recommendation of crops is dependent on various parameters. Precision agriculture aims is in identifying these parameters in a site- specific manner in order to resolve issues regarding crop selection. For identifying the best suitable crop for field we use this Crop recommendation system

1.INTRODUCTION

India is one among the oldest countries which is still practicing agriculture. But in recent times the trends in agriculture has drastically evolved due to globalization. Various factors have affected the health of agriculture in India. Many new technologies have been evolved to regain the health. One such technique is precision agriculture. Precision agriculture is budding in India .Precision agriculture is the technology of “site-specific” farming. It has provided us

with the advantage of efficient input, output and better decisions regarding farming.

Although precision agriculture has delivered better improvements it is still facing certain issues.

There exist many systems which propose the inputs for a particular farming land. Systems propose crops, fertilizers and even farming techniques. Recommendation of crops is one major domain in precision agriculture. Recommendation of crops is dependent on various parameters. Precision agriculture aims in identifying these parameters in a

site-specific manner in order to resolve issues regarding crop selection. The “site-specific” technique has improved the results yet there is a need to supervise the results of such systems. Not all precision agriculture systems provide accurate results. But in agriculture it is important that the recommendations made are accurate and precise because in case of errors it may lead to heavy material and capital loss.

Many research works are being carried out, in order to attain an accurate and efficient model for crop prediction. Ensembling is one such technique that is included in such research works. Among these various machine learning techniques that are being used in this field; this paper proposes a system that uses the voting method to build an efficient and accurate model

2.LITERATURE SURVEY

2.1 Crop Selection Method to Maximize Crop Yield Rate using Machine Learning Technique Authors: Rakesh Kumar, M.P. Singh, Prabhat Kumar.J.P. Singh

This paper proposed a method named Crop Selection Method (CSM) to solve crop selection problem, and maximize net yield rate of crop over season and subsequently achieves maximum economic growth of the country. The proposed method may improve net yield rate of crops.

2.2 AgroConsultant: Intelligent Crop Recommendation System Using Machine Learning Algorithms Authors: Zeel Doshi, Subhash Nadkarni, Rashi Agrawal, Prof. Neepa Shah

This paper, proposed and implemented an intelligent crop recommendation system, which can be easily used by farmers all over India. This system would assist the farmers in making an informed decision about which crop to grow depending on a variety of environmental and geographical factors. We have also implemented a secondary system, called Rainfall Predictor, which predicts the rainfall of the next 12 months.

2.3 Development of Yield Prediction System Based on Real-time Agricultural meteorological Information Haedong Lee *, Aekyung Moon* * ETRI, 218 Gajeong-ro, Yuseong-gu, 305-700, Korea

This paper contains about the research and the building of an effective agricultural yield forecasting system based on real-time monthly weather. It is difficult to predict the agricultural crop production because of the abnormal weather that happens every year and rapid regional climate change due to global warming. The development of agricultural yield forecasting system that leverages real-time weather information is

urgently required. In this research, we cover how to process the number of weather and how to configure the prediction

2.4 Analysis of Soil Behaviour and Prediction of Crop Yield using Data Mining Approach

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This work presents a system, which uses data mining techniques in order to predict the category of the analyzed soil datasets. The category, thus predicted will indicate the yielding of crops. The problem of predicting the crop yield is formalized as a classification rule, where Naive Bayes and K-Nearest Neighbor methods are used.

3. PROPOSED SYSTEM

We to eliminate the aforementioned drawbacks, we propose an Intelligent Crop Recommendation system- which takes into consideration all the appropriate parameters, including temperature, rainfall, nitrogen content, phosphorous, potassium, humidity and PH value, to predict crop suitability. This system is fundamentally concerned with performing the primary function of Agro Consultant, which is, providing crop recommendations to farmers algorithms

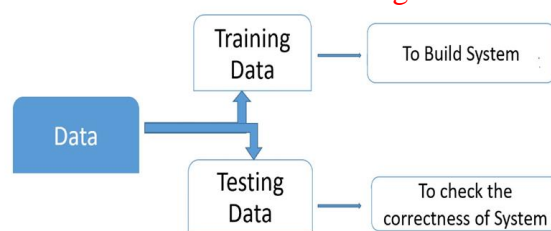


Fig 1: Architecture

3.1 IMPLEMENTATION

This system is divided into four modules they are

1. Import Dataset

2. Preprocess Dataset

3. Train With Machine Learning Algorithms

4. Upload Test Data & Verify Statistics.

3.1.1 IMPORT DATASET : This phase it will import the dataset into the project. The dataset has the values of Rainfall, Humidity, Temperature, Soil Parameters and PH values. The crop production dataset that is used to predict the name of the crop is fed into classification and regression algorithms.

3.1.2 PREPROCESS DATASET :

Experiments were conducted on dataset and it has been established that Random Forest Regressor gives the highest yield prediction accuracy. By combining rainfall, temperature along with other parameters like season and area, Crop and

yield prediction for a certain district can be made.

3.1.4 TRAIN WITH MACHINE LEARNING ALGORITHM:

This focus on the crop prediction according to the soil parameters like Potassium, Phosphorus and Nitrogen and Climate parameters like Rainfall, Humidity, Temperature and PH. This also focuses on district wise yield prediction according to the crop sown in the district. Yield is being

predicted for given crops district wise and crops with best yield.

3.1.5 UPLOAD TEST AND VERIFY THE STATISTICS:

Results reveals that Random Forest is the best classifier when all parameters are combined. This will not only help farmers in choosing the right crop to grow in the next season but also bridge the gap between technology and the agriculture sector.

4.RESULTS AND DISCUSSION

Crop Recommendation

Enter Nitrogen value in %

 - +

Enter Phosphorus value in %

 - +

Enter Potassium value in %

 - +

Enter Temperature in deg.c

 - +

Enter Humidity value

 - +

Enter PH value (0-7)

0 7

Enter RainFall value in mm

 - +

Recommended crop to grow is: Rice

Fig 2:Recommended Crop

Crop Recommendation

Enter Nitrogen value in %
96.00 - +

Enter Phosphorus value in %
86.00 - +

Enter Potassium value in %
51.00 - +

Enter Temperature in deg.c
21.00 - +

Enter Humidity value
77.00 - +

Enter PH value (0-7)
0 6 7

Enter RainFall value in mm
99.00 - +

Recommended crop to grow is: Banana

Fig 3:Recommended Crop

Crop Recommendation

Enter Nitrogen value in %
53.00 - +

Enter Phosphorus value in %
67.00 - +

Enter Potassium value in %
17.00 - +

Enter Temperature in deg.c
31.00 - +

Enter Humidity value
69.00 - +

Enter PH value (0-7)
0 7

Enter RainFall value in mm
61.10 - +

Recommended crop to grow is: Blackgram

Fig 4:Recommended Crop

By giving the farmer information that regular farmers don't consider, this system aids in crop selection, lowering the likelihood of crop failure and raising productivity. Additionally, it stops them from suffering losses. Millions of farmers across the nation can access the system, which can be expanded to the web. The crop prediction system will be further developed to integrate with a yield predictor, another subsystem that would also give the farmer an estimate of production if he plants the suggested crop.

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